Date of Issue:
29 January 2015

SAFETY DATA SHEET

1. Substance and Source Identification

Product Identifier

RM Number: 8631a
RM Name: Medium Test Dust (MTD)
Other Means of Identification: Not applicable.

Recommended Use of This Material and Restrictions of Use

A unit of Reference Material (RM) 8631a, an ISO Medium Test Dust (MTD), consists of 20 g of a natural mineral dust that is heterogeneous in composition and polydisperse with respect to size. RM 8631a is intended to be used as a secondary material for calibrating particle sizing instruments, especially optical particle counters, when used in conjunction with either of two published standard methods.

Company Information

National Institute of Standards and Technology
Standard Reference Materials Program
100 Bureau Drive, Stop 2300
Gaithersburg, Maryland 20899-2300

Telephone: 301-975-2200
FAX: 301-948-3730
E-mail: SRMMSDS@nist.gov
Website: http://www.nist.gov/srm

Emergency Telephone ChemTrec:
1-800-424-9300 (North America)
+1-703-527-3887 (International)

2. Hazards Identification

Classification

Physical Hazard: Not classified.
Health Hazard: Carcinogenic, Category 1
STOT, Repeat Exposure Category 1

Label Elements
Symbol

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Signal Word
Danger

Hazard Statement(s)

H350	May cause cancer (lung) via inhalation.
H372	Causes damage to lungs through prolonged or repeat inhalation.

Precautionary Statement(s)

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P260	Do not breathe dust.
P264	Wash hands thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P280	Wear eye protection, protective gloves and clothing.
P308+P313	If exposed or concerned: Get medical attention.
P405	Store locked up.
P501	Dispose of contents and container in accordance with local regulations.

Hazards Not Otherwise Classified: Not applicable.

Ingredients(s) with Unknown Acute Toxicity: Not applicable.

3. Composition and Information on Hazardous Ingredients

Substance: Medium test dust

Other Designations: Mineral dust

Hazardous Component(s)	CAS Number	EC Number (EINECS)	Nominal Mass Concentration (%)
Medium Test Dust	65996-94-3	266-029-8	100
Silica, crystalline quartz	14808-60-7	238-878-4	68 to 76
Aluminum oxide	1344-28-1	215-691-6	10 to 15
Iron oxide	1309-37-1	215-168-2	2 to 5
Sodium oxide	1313-59-3	215-208-9	2 to 4
Calcium oxide	1305-78-8	215-138-9	2 to 5
Magnesium oxide	1309-48-4	217-171-9	1 to 2
Titanium dioxide	13463-67-7	236-675-5	0.5 to 1
Potassium oxide	12136-45-7	235-227-6	2 to 5

4. First Aid Measures

Description of First Aid Measures:

Inhalation: If adverse effects occur, remove to uncontaminated area. If not breathing, give artificial respiration or oxygen by qualified personnel. Seek immediate medical attention.

Skin Contact: Wash skin with soap and water.

Eye Contact: Flush eyes with water for at least 15 minutes. If necessary, seek medical attention.

Ingestion: If adverse effects occur after ingestion, seek medical treatment.

Most Important Symptoms/Effects, Acute and Delayed: Prolonged exposure to respirable silica particles can cause lung damage (silicosis) and cancer.

Indication of any immediate medical attention and special treatment needed, if necessary: If any of the above symptoms are present, seek medical attention if needed.

5. Fire Fighting Measures

Fire and Explosion Hazards: Negligible fire hazard. Avoid generating dust. See Section 9, "Physical and Chemical Properties" for flammability properties.

Extinguishing Media:

Suitable: Regular dry chemical, carbon dioxide, water, regular foam.
Unsuitable: None listed.

Specific Hazards Arising from the Chemical: None listed.

Special Protective Equipment and Precautions for Fire-Fighters: Avoid inhalation of material or combustion byproducts. Wear full protective clothing and NIOSH approved self-contained breathing apparatus (SCBA).

NFPA Ratings (0 = Minimal; 1 = Slight; 2 = Moderate; 3 = Serious; 4 = Severe)

Health = 1 Fire = 0 Reactivity = 0

6. Accidental Release Measures

Personal Precautions, Protective Equipment and Emergency Procedures: Any accumulated material on surfaces should be removed and properly disposed of. Use suitable protective equipment; see Section 8, "Exposure Controls and Personal Protection".

Methods and Materials for Containment and Clean up: Collect spilled material in appropriate container for disposal. Keep out of water supplies and sewers. Keep unnecessary people away, isolate hazard area and deny entry.

7. HANDLING AND STORAGE

Safe Handling Precautions: Minimize dust generation and accumulation on surfaces. Routine housekeeping should be instituted to ensure that dusts do not accumulate on surfaces. See Section 8, "Exposure Controls and Personal Protection". Avoid contact with incompatible materials (see Section 10 "Stability and Reactivity").

Storage: Store and handle in accordance with all current regulations and standards.

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Exposure Limits			
Components	**OSHA (PEL)**	**ACGIH (TLV)**	**NIOSH (REL)**
Silica, crystalline quartz	TWA: $30/(SiO_2 + 2)$ mg/m^3 (total dust) TWA: $10/(SiO_2 + 2)$ mg/m^3 (respirable fraction) TWA: $250/(SiO_2 + 5)$ mppcf (respirable fraction)	TWA: 0.025 mg/m^3 (respirable fraction)	TWA: 0.05 mg/m^3 (respirable dust) IDLH: 50 mg/m^3 (respirable dust)
Aluminum oxide	TWA: 15 mg/m^3 (total dust) TWA: 5 mg/m^3 (respirable fraction)	TWA: 1 mg/m^3 (respirable fraction) related to Aluminum insoluble compounds	No occupational limits established.
Iron oxide	TWA: 10 mg/m^3 (fume) TWA: 15 mg/m^3 (total dust) TWA: 5 mg/m^3 (respirable fraction)	TWA: 5 mg/m^3 (respirable fraction)	TWA: 5 mg/m^3 (as Fe dust and fume) IDLH: 2500 mg/m^3 (as Fe dust and fume)
Calcium oxide	TWA: 5 mg/m^3	TWA: 2 mg/m^3	TWA: 2 mg/m^3 IDLH: 25 mg/m^3
Magnesium oxide	TWA: 15 mg/m^3 (fume, total dust)	TWA: 10 mg/m^3 (inhalable fraction)	IDLH: 750 mg/m^3 (fume)
Titanium dioxide	TWA: 15 mg/m^3 (total dust)	TWA: 10 mg/m^3 (total dust)	IDLH: 5000 mg/m^3

Engineering Controls: Provide local exhaust or process enclosure ventilation system. Ensure compliance with applicable exposure limits.

Personal Protection: In accordance with OSHA 29 CFR 1910.132, subpart I, wear appropriate Personal Protective Equipment (PPE) to minimize exposure to this material.

Respiratory Protection: If workplace conditions warrant a respirator, a respiratory protection program that meets OSHA 29CFR 1910.134 must be followed. Refer to NIOSH 42 CFR 84 for applicable certified respirators.

Eye/Face Protection: Wear splash resistant safety goggles with a face shield. An eye wash station should be readily available near areas of use.

Skin and Body Protection: Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. Chemical-resistant gloves should be worn at all times when handling chemicals.

9. PHYSICAL AND CHEMICAL PROPERTIES

Descriptive Properties:	**Test Dust**
Appearance (physical state, color, etc.)	tan, light brown, brown, reddish brown solid.
Molecular Formula	not applicable
Molar Mass (g/mol)	not applicable
Odor	no odor
Odor threshold	not applicable
pH	not available
Evaporation rate	not available

Descriptive Properties:	**Test Dust**
Melting point/freezing point	not available
Specific Gravity (water=1)	2.65
Vapor Pressure (mmHg)	not applicable
Vapor Density (air = 1)	not applicable
Viscosity (cP)	not applicable
Solubility(ies)	insoluble in water
Partition coefficient (n-octanol/water)	not available
Particle Size	<40 μm
Thermal Stability Properties	
Autoignition Temperature	not combustible
Thermal Decomposition	not applicable
Initial boiling point and boiling range	4040 F
Explosive Limits, LEL (Volume %)	none
Explosive Limits, UEL (Volume %)	none
Flash Point	none
Flammability (solid, gas)	not applicable

10. STABILITY AND REACTIVITY

Reactivity: Stable at normal temperatures and pressure.

Stability: **X** **Stable** _____ **Unstable**

Possible Hazardous Reactions: None listed.

Conditions to Avoid: Avoid generating dust. Avoid heat, flames, sparks, and other sources of ignitions. Avoid contact with incompatible materials.

Incompatible Materials: Acids, bases, halogens, metal salts, metals, oxidizing materials, combustible materials.

Fire/Explosion Information: See Section 5, "Fire Fighting Measures".

Hazardous Decomposition: Thermal decomposition will produce oxides of phosphorus, silicon compounds.

Hazardous Polymerization: _____ Will Occur X Will Not Occur

11. TOXICOLOGICAL INFORMATION

Route of Exposure: X Inhalation X Skin _____ Ingestion

Symptoms Related to the Physical, Chemical and Toxicological Characteristics: May aggravate respiratory disorders.

Potential Health Effects (Acute, Chronic, and Delayed)

Inhalation: Irritation, cough phlegm. Prolonged or repeated exposure to mixtures containing respirable silica may cause cough, expectoration, dyspnea, wheezing, pharyngitis, chronic bronchitis, emphysema, silicosis, and lung cancer.

Skin Contact: May cause mechanical irritation.

Eye Contact: May cause irritation or eye damage.

Ingestion: May cause irritation.

Numerical Measures of Toxicity

Acute toxicity: Not classified.
Aluminum oxide, Oral Rat LD50: >5 000 mg/kg
Iron oxide, Oral Rat LD50: >10 000 mg/kg
Titanium dioxide, Oral Rat LD50: >10 000 mg/kg

Skin corrosion/irritation: No data available.
Sodium oxide: contact with moist skin can cause irritation
Calcium oxide: contact with moist skin can cause irritation

Titanium dioxide: 300 µg/3 day(s) intermittent Skin Human mild
Potassium oxide: contact with skin can cause irritation

Serious eye damage/eye irritation: No data available.
Calcium oxide: contact with moisture in eyes may cause irritation, lacrimation, blurred vision, and conjunctivitis.
Potassium oxide: may cause irritation

Respiratory sensitization: No data available.

Skin sensitization: No data available.

Germ Cell Mutagenicity: No data available.
Iron oxide, human, 40 µg per disk (4 h)
Titanium dioxide, human, 2 µmol/L (72 h) hamster 1 µmol/L

Carcinogenicity: Category 1.

Listed as a Carcinogen/Potential Carcinogen X **Yes** _____ **No**

Silica, crystalline quartz is listed as Group 1, *carcinogenic to humans* by IARC, *known human carcinogen* (respirable size) by NTP, and is not listed by OSHA as a designated carcinogen.
Tumorigenic data: Rat, Inhalation, TCLo: 50 mg/m^3 (6 h)
Mutagenic data: Human, 120 mg/L (24 h)
Iron oxide is listed by IARC as Group 3, *not classifiable*. It is not listed by NTP or OSHA.
Titanium dioxide is listed by IARC as Group 2B, *possibly carcinogenic to humans*. It is not listed by NTP or by OSHA.
Tumorigenic, Rat Inhalation, TC: 10 mg/m^3 (18 hour)
Magnesium oxide, tumorigenic data: Hamster, intratracheal, TDLo: 480 mg/kg (30 week)
Aluminum oxide, sodium oxide, calcium oxide, magnesium oxide, potassium oxide are not classified by NTP, IARC, or OSHA.

Reproductive Toxicity: No data available.

Specific Target Organ Toxicity, Single Exposure: No data available.

Specific Target Organ Toxicity, Repeated Exposure: Category 1, Lungs.
Repeated and prolonged exposure to respirable quartz may cause chronic bronchitis, emphysema, and silicosis.

Aspiration hazard: Not applicable.

12. ECOLOGICAL INFORMATION

Ecotoxicity Data:
Calcium oxide: Fish, Carp (*Cyprinus carpio*) LC50: 1070 mg/L [static].

Persistence and Degradability: No data available.

Bioaccumulative Potential: No bioaccumulation for calcium oxide; No data available for other components.

Mobility in Soil: No data available.

Other Adverse effects: No data available.

13. DISPOSAL CONSIDERATIONS

Waste Disposal: Dispose of waste in accordance with all applicable federal, state, and local regulations.

14. TRANSPORTATION INFORMATION

U.S. DOT and IATA: Not regulated by DOT or IATA.

15. REGULATORY INFORMATION

U.S. Regulations:
CERCLA Sections 102a/103 (40 CFR 302.4): Not regulated.
SARA Title III Section 302 (40 CFR 355.30): Not regulated.
SARA Title III Section 304 (40 CFR 355.40): Not regulated.

SARA Title III Section 313 (40 CFR 372.65): Not regulated.
OSHA Process Safety (29 CFR 1910.119): Not regulated.
SARA Title III Sections 311/312 Hazardous Categories (40 CFR 370.21):

ACUTE HEALTH:	No
CHRONIC HEALTH:	Yes
FIRE:	No
REACTIVE:	No
PRESSURE:	No

State Regulations:

California Proposition 65: Warning! This product contains a chemical (quartz, titanium dioxide) known to the state of California to cause cancer.

U.S. TSCA Inventory: Silica, aluminum oxide, iron oxide, sodium oxide, calcium oxide, magnesium oxide, titanium dioxide, and potassium oxide are listed.

TSCA 12(b), Export Notification: Not listed.

Canadian Regulations: WHMIS Information is not provided for this material.

16. OTHER INFORMATION

Issue Date: 29 January 2015

Sources:

ChemADVISOR, Inc., SDS, *Quartz*, 10 September 2014.
ChemADVISOR, Inc., SDS, *Aluminum Oxide*, 10 September 2014.
ChemADVISOR, Inc., SDS, *Iron Oxide*, 10 September 2014.
ChemADVISOR, Inc., SDS, *Sodium Oxide*, 10 September 2014.
ChemADVISOR, Inc., SDS, *Calcium Oxide*, 10 September 2014.
ChemADVISOR, Inc., SDS, *Magnesium Oxide*, 10 September 2014.
ChemADVISOR, Inc., SDS, *Titanium Dioxide*, 10 September 2014.
ChemADVISOR, Inc., SDS, *Potassium Oxide*, 10 September 2014.
Powder Technology Inc., MSDS, *Arizona Sand Including Arizona Test Dust*, 21 January 2014.

Key of Acronyms:

ACGIH	American Conference of Governmental Industrial Hygienists	NRC	Nuclear Regulatory Commission
ALI	Annual Limit on Intake	NTP	National Toxicology Program
CAS	Chemical Abstracts Service	OSHA	Occupational Safety and Health Administration
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act	PEL	Permissible Exposure Limit
CFR	Code of Federal Regulations	RCRA	Resource Conservation and Recovery Act
DOT	Department of Transportation	REL	Recommended Exposure Limit
EC50	Effective Concentration, 50 %	RM	Reference Material
EINECS	European Inventory of Existing Commercial Chemical Substances	RQ	Reportable Quantity
EPCRA	Emergency Planning and Community Right-to-Know Act	RTECS	Registry of Toxic Effects of Chemical Substances
IARC	International Agency for Research on Cancer	SARA	Superfund Amendments and Reauthorization Act
IATA	International Air Transportation Agency	SCBA	Self-Contained Breathing Apparatus
IDLH	Immediately Dangerous to Life and Health	SRM	Standard Reference Material
LC50	Lethal Concentration, 50 %	STEL	Short Term Exposure Limit
LD50	Lethal Dose, 50 %	TLV	Threshold Limit Value
LEL	Lower Explosive Limit	TPQ	Threshold Planning Quantity
MSDS	Material Safety Data Sheet	TSCA	Toxic Substances Control Act
NFPA	National Fire Protection Association	TWA	Time Weighted Average
NIOSH	National Institute for Occupational Safety and Health	UEL	Upper Explosive Limit
NIST	National Institute of Standards and Technology	WHMIS	Workplace Hazardous Materials Information System

Disclaimer: Physical and chemical data contained in this SDS are provided only for use in assessing the hazardous nature of the material. The SDS was prepared carefully, using current references; however, NIST does not certify the data in the SDS. The values for this material are given in the NIST Report of Investigation.

Users of this SRM should ensure that the SDS in their possession is current. This can be accomplished by contacting the SRM Program: telephone (301) 975-2200; fax (301) 948-3730; e-mail srmmsds@nist.gov; or via the Internet at http://www.nist.gov/srm.